

Nurse Practitioner-lead Multidisciplinary Approach to Prevention of Cytomegalovirus (CMV) in Kidney and Liver Transplant Recipients

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Introduction

CMV disease can be prevented in most SOT recipients provided that a prevention protocol is followed. We discovered that our center's protocol, which includes proper antiviral drug dosing and CMV blood PCR monitoring, was not being uniformly followed, resulting in preventable CMV complications. Reduction of post-transplant infection was identified at our institution as a target for concerted effort to eliminate preventable harm. In June 2015 a nurse practitioner (NP) was hired to support these efforts, and in 2016 a multidisciplinary team developed an electronic medical record (EPIC) based patient monitoring tool. We report our experience utilizing this approach to improve adherence with a CMV prevention protocol in CMV D+/R- patients.

Methods

- A Transplant Infectious Disease NP and a multidisciplinary CMV prevention care improvement committee created a comprehensive QI intervention including a CMV D+/R- report in EPIC that provides alerts regarding dose of valganciclovir, renal function and whether a patient is undergoing timely CMV PCR monitoring.
- We evaluated the impact of these interventions over a 1 year follow up period in 263 consecutive CMV D+/R- kidney and/or liver transplant recipients in two eras.

Era 1

82 patients transplanted between 3/31/16 and 6/8/17

- Liver 31
- Kidney 44
- SLK 4
- SPK 3

Monitored per QI initiative.

Era 2

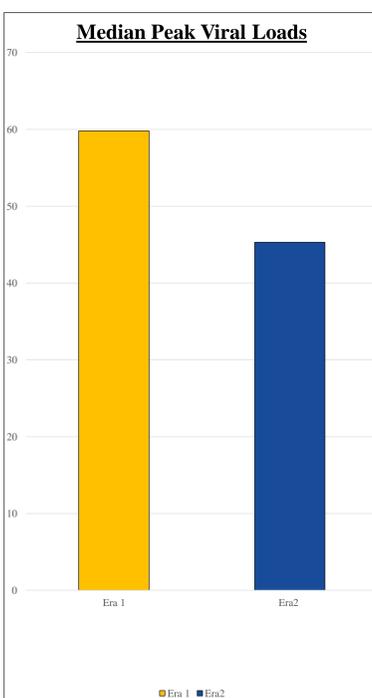
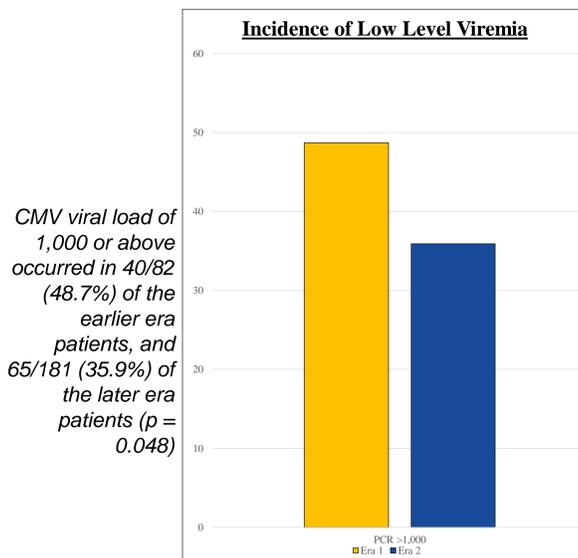
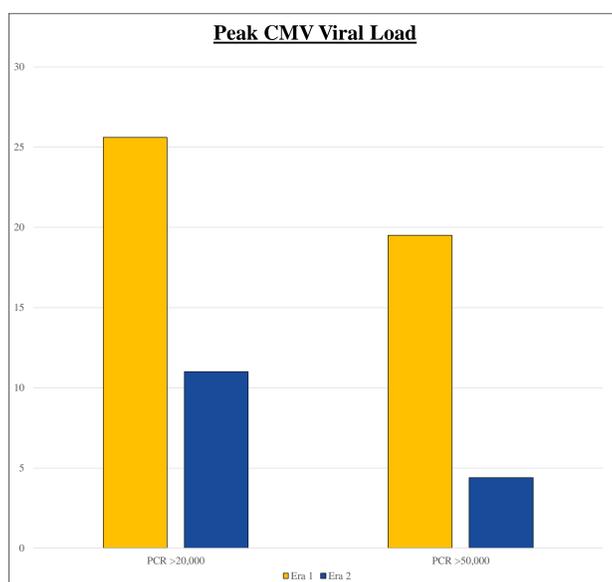
181 patients transplanted between 6/9/17 and 12/31/19

- Liver 73
- Kidney 94
- Pancreas 1
- SLK 6
- SPK 7

Monitored per QI initiative plus NP-monitored EPIC

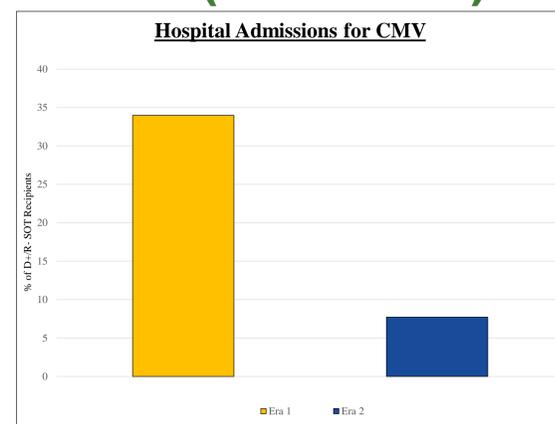
Results

- CMV viral loads of **20,000** or above occurred in 21/82 (25.6%) of the earlier era patients, and 20/181 (11%) of the later era patients ($p = 0.003$)
- CMV viral load of **50,000** or above occurred in 16/82 (19.5%) of the earlier era patients, and 8/181 (4.4%) of the later era patients ($p < 0.001$).



A greater percentage of patients in the earlier era (49/82 or 59.8%) than in the later era (82/181 or 45.3%) had CMV viral loads that exceeded the median for the entire study population ($p=0.03$)

Results (continued)



CMV admissions occurred in 28/82 (34%) of the earlier era patients, and 14/181 (7.7%) of the later era patients ($p < 0.001$).

Key Findings

Highly significant differences between eras 1 and 2 included:

- A decrease in the % of D+/R- patients with CMV viral loads > 20,000 from 25.6% to 11%.
- A decrease in the % of CMV D+/R- patients with viral loads > 50,000, going from nearly **20%** in the earlier era, down to less than **5%** in the current era.
- Minimal improvement in incidence of low-level CMV viremia from 48.7% to 35.9%.
- A marked decrease in hospital admission for complications of CMV from 34% of patients in the era 1 to 7.7% in the current era. Differences of such magnitude have enormous clinical and cost saving implications.

Conclusions

A multidisciplinary intervention, centered around an ID nurse practitioner and facilitated by an electronic medical record tool, improves adherence with CMV prevention best practices and reduces severity of, and hospitalization for, CMV disease in kidney and liver transplant recipients.

